Tables for the Analysis of a Simple Salt. By A. Vinter, M.A. (London: Longmans and Co., 1880).

MANY tables for the qualitative analysis of simple salts already exist; another set is just added to the list by Mr. A. Vinter. It is very probable that students who—like those for whom Mr. Vinter's tables are arranged- can only devote one hour a week to practical chemistry, would do well to add that hour to those allotted to some other study; but if school-teachers will give their boys so insignificant a smattering of practical chemistry, these tables will, we think, be found useful and generally accurate so far as they go, which is certainly but a very little way indeed.

LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.*

[*The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.*]

The late Count L. F. de Pourtales

EVERY naturalist must have noticed with regret the news of the death of M. de Pourtales, of Cambridge, Mass., U.S., but those who have had the pleasure of his friendship and who have been fellow-labourers with him feel a most sincere sorrow at the loss which science has sustained.

The exploration of the deep sea brought Pourtales prominently before the scientific world, and his practical knowledge of the art of dredging not only produced results which were of great importance to Alexander Agassiz and Lyman, but they also provided him with a wonderful series of deep-sea corals, upon which he laboured with great success. The floor of the Gulf Stream in the Straits of Florida, the dredgings of the *Hassler* Expedition, and lastly, the examination of the results of the work done in the Caribbean Sea during the voyage of the U.S. steamer *Blake*, gave the opportunity, which was readily seized and utilised, of contributing largely and thoroughly to the knowledge of the interesting Madreporarian fauna of the depths. I can testify to the solid merit of the work done by my friend, and I can never forget his generous assistance, kindly criticisms, and desire to obtain the perfect truth. He spared no pains, and was ever at work in the difficult subject he especially chose; and he speedily grasped the relations of the past and present deep-sea coral faunas, and, besides adding largely to our knowledge of forms, contributed in a most important manner to the study of the generic and specific value of certain structures. Of his knowledge of the Crinoidea I need not write, but of the great value of the researches of the grave, courteous, and most genial man who is no longer amongst us I shall ever speak in terms of great admiration and gratitude.

Athenæum, August 8 P. MARTIN DUNCAN

The Recent Gas Explosion

ACCORDING to promise, I write to describe the continuation of the experiments on the above subject.

At present there is little else than failure to report, but as I am leaving home to-day and shall not be able to try any additional experiments for the next three or four weeks, I will merely mention the results obtained.

A piece of composition gas-pipe 10m. long, 15mm. internal diameter, and 2 mm. thick, was filled with a mixture of 2 vols. of hydrogen to 1 vol. of oxygen, and the gas exploded. The tube was not affected, the cork which closed it being projected.

It was then filled with a mixture of 10 volumes of coal-gas and 12 of oxygen, and in this case the tube withstood the explosion; a piece of india-rubber tube covered with calico tightly bound round it, which was used to connect the farther end of the tube to a metal stopcock, was however burst and the calico torn.

To-day I tried a tube made of paper. The tube is 7 mm. in diameter, and consists of eight layers of thin paper, stuck together with paste, and varnished on the outside with shellac.

This I have not succeeded in bursting with the mixture of hydrogen and oxygen; one of the caoutchouc stoppers which closed the glass tubes cemented to the end of the paper tube was blown off.

I hope to repeat the experiment with another paper tube which is not so strong. HERBERT MCLEOD

Cooper's Hill, August 9

Heat of the Comstock Lode

IN May, 1878, Mr. Church, who was at that time Professor of Mining at the University of Ohio, read a paper before the American Institute of Mining Engineers on the heat of the Comstock mines, which was subsequently, in an extended form, included in the author's volume on the Comstock lode, of which a review appeared in NATURE (vol. xxi. p. 511).

In this paper Mr. Church states that the temperature of the waters issuing from the mines worked upon the Comstock lode has always been somewhat high, but it was not until they had attained a very considerable depth below the surface that the workmen first became inconvenienced by extraordinary heat. At their present greatest depth (about 2,700 feet) water issues from the rock at a temperature of 157° F. (70° C.), and at least 4,200,000 tons of water are annually pumped from the workings at a temperature of 135° F. Mr. Church estimates that to elevate such a large volume of water from the mean temperature of the atmosphere to that which it attains in the mines would require 47,700 tons of coal. In addition to this, the calculates, 7,859 tons of coal would be required to supply the heat absorbed by the air passing along the various shafts and galleries through which it is diverted for the purposes of ventilation. It follows that to develop the total amount of heat necessary to raise the water and air circulating in these mines from the mean temperature of the atmosphere to that which they respectively attain, 55,560 tons of coal, or 97,700 cords of firewood would be annually required.

Mr. Church, in his paper, quotes four analyses of waters from the Comstock lode taken at different depths; these vary somewhat as to the relative proportions of the various substances present, but they contain on an average 42·62 grains of solid matter to the gallon. Of this amount 20·74 grains are calcic sulphate, 12·13 grains carbonate of potassium, 4·85 grains carbonate of sodium, and ·66 grain of chloride of sodium.

In order to ascertain approximately to what extent the production of the large amount of heat absorbed by the water may be ascribed to oxidation of sulphur and iron, the author first calculates the quantity which would be developed by the oxidation of pyrites equivalent to the calcic sulphate in solution. But having found that this amounts to only about $\frac{1}{10}$th part of that required, he seeks another solution for the difficulty, and without any calculations in support of the hypothesis, attributes this enormous development of heat to the kaolinisation of felspar in the subjacent rocks.

In a communication to the Geological Society of London, published in their *Quarterly Journal*, August 1879, entitled, "A Contribution to the History of Mineral Veins," I endeavoured to show that the kaolinisation of felspars is as inadequate to produce the effects observed as is the oxidation of pyrites, and a recent paper read by Mr. Church before the American Institute of Mining Engineers, as well as his letter on Subterranean *Kao*linisation in last week's NATURE, have been written with a view of answering these objections.

In my communication to the Geological Society I applied to the kaolinisation of felspars a similar line of reasoning to that adopted by Mr. Church with regard to the oxidation of pyrites.

The average proportion of alkalies contained in the rocks of the district is 6·40 per cent., while the mean of the published analyses gives 11·30 grains of alkalies in the U.S. gallon of water. It follows that the 4,200,000 tons of water annually pumped out must contain 813 tons of alkalies, and that, as these are present in the rocks in the proportion of 6·40 per cent., the felspar in 12,703 tons of rock must be annually kaolinised and the alkalies removed in solution.

The amount of rock in which the felspar has been kaolinised being 12,703 tons, and the number of tons of water pumped out of the mines 4,200,000, it follows that $\frac{4,200,000}{12,700} = 330$ is the number of tons of water heated by each ton of completely altered rock.

In order, therefore, that one ton of rock should be enabled to heat 330 tons of water only 1° Fahr., and the specific heat of these rocks be taken at ·1477, that of blast-furnace slags, it would require to be heated by the kaolinisation of its felspar to a temperature above that of molten gold. Consequently to raise the water 85°, or to a temperature of 135°, at which it issues, the

© 1880 Nature Publishing Group

kaolinisation of the felspar in each ton of rock would require to elevate it to an extent it would be difficult to estimate.

To this Mr. Church, who derives his heat from the hydration of silicate of aluminium during the formation of kaolin, objects that the whole of the alkalies liberated by the decomposition of felspar do not become dissolved in water, and that their amount cannot consequently be taken as a measure of the quantities of that mineral which have been decomposed.

In support of this argument he states that clays from the immediate neighbourhood of the Comstock lode still contain above 4½ per cent. of alkalies, and ignores the fact that the final result of kaolinisation is the production of a hydrated silicate of aluminium free from alkalies. The clays in question must consequently be regarded as containing undecomposed felspar which cannot have contributed to any increase of temperature.

Admitting however for the sake of argument that all the felspar has been decomposed, and that three-fourths of the alkalies present have been retained by the resulting clay, the heat corresponding to the decomposition and hydration of the felspars in a ton of rock must be reduced by three-fourths. If, therefore, as before, to simplify our ideas, we regard the heat required to produce the observed effects as due to a single variation of temperature, the original temperature must have been above twenty times higher than the melting point of gold, which appears as improbable as that found on the assumption of the whole of the alkalies entering into solution.

The assumption now made, namely, that much of the kaolinisation of the felspar is accomplished by aqueous vapour which is entirely absorbed by the rock, and which does not give rise to any aqueous solutions, involves conditions of which we have no known example, and of which it is difficult to conceive the existence at such great depths below the water-level of the country.

This view of the question was not advanced by Mr. Church in his original paper of 1878, and has probably occurred to him subsequently to the publication of my observations in the *Quarterly Journal of the Geological Society* in the following year. If however the possibility of such an alteration were admitted, it certainly could not be ascribed to kaolinisation, since the removal of the alkalies in felspars is an essential factor in that transformation.

With regard to the hot spring which formerly issued from between slate rocks and an elvan dyke at Wheal Clifford Mine in Cornwall containing notable quantities of chloride of lithium and other alkaline salts, cited by Mr. Church in his recent pamphlet in support of his views with respect to kaolinisation, the effect has probably been taken for the cause. Hot water is known to be a better solvent of mineral matter than cold water, and it has been shown by Daubrée that at high temperatures and under great pressure it is even capable of rapidly dissolving silica out of glass, and of leaving it in the form of crystallised quartz.

We have no direct evidence that the dissociation of the constituents of felspar and the subsequent hydration of the clay produced give rise to any liberation of heat. It is well known that the temperature of mines situated in granite, where kaolinisation is constantly going on, is lower than that of those worked in clay-slate, while high temperatures or thermal springs are not more frequently observed in masses of kaolinised granite than elsewhere.

The mines on the Comstock lode are situated in a highly-volcanic region of very late tertiary age, and in the almost immediate vicinity of lava-flows and boiling springs. Until, therefore, stronger evidence than that yet furnished shall have been brought forward, it is probable that the majority of geologists may continue to ascribe these phenomena to the action of volcanic agencies. J. Arthur Phillips

18, Fopstone Road, Kensington, S.W., August 9

British Museum Attendants

As you are a free lance in British Museum matters, will you not make some remarks on the attendants? They are, as a body, intelligent and desirous of learning, but no attempts seem ever to be made to instruct them in the subjects of their departments; and all the information they possess is picked up by scraps, from overhearing the remarks of their chiefs to distinguished visitors.

Many of them do what they can to teach themselves; but why should they not have some regular training, and be competent to give simple and informal description-lectures to parties who really go for instruction? It cannot be said that it would imperil their charges by occupying their attention, when we see how a far scantier supply of care-takers completely guard South Kensington.

The object is not to get a higher paid and superior class of men, but to give them the advantages they might reasonably enjoy, and use them as rational beings. I have heard some of them deplore the way in which they are treated, "like so many watch-dogs"; the snuff-taking to keep awake; the lapses of the stouter ones into afternoon naps; the forbidden conversations, even on the objects of their care, with visitors; the reading of all the advertisements of the *Times*, for lack of better interest; all these are familiar subjects, as you will find if you once tap the flow of forbidden talk successfully.

Some attention to them might prevent such a colloquy as I once had with a flashy-looking fellow on one of the many unlabelled objects in his department. I asked, "Do you know where that squared block is from that stands on that terminal ornament?" Gallio (with a flower in his button-hole): "Which do you mean?" "That one which has another rough block standing on it." Gallio (impatiently): "Well! what about it?" "Do you know where it came from?" Gallio (with ineffable contempt): "No! indeed; I don't know where it's from. I don't know anything about it." If you should care to quote this, I can vouch for its accuracy, as I noted it at the time.

Bromley, Kent Wm. Flinders Petrie

Quassia and Mosquitos

In Nature, vol. xxii. p. 11, I read a letter in which the employment of a wash made from a decoction of quassia wood was recommended as a protection from the attacks of mosquitos and other insect pests. After reading the above-named letter I sent some of the quassia to my son, who is a surveyor camping out on the prairie in Dakotah Territory, U.S.A., in a part much infested in hot weather by mosquitos. In a recent letter my son states that he has repeatedly tried the wash with quassia, but without any beneficial results, the mosquitos having attacked him even before the solution had dried on his skin.

I have suggested that he should try carbolic acid ointment, if he can procure any, as English insects do not like the carbolic odour.

Possibly the mosquitos referred to in your correspondent's letter may have been much better fed than the North American tormentors.

If any of your numerous readers could communicate some effectual protection against the attacks of these pests, it would be a great boon to those who suffer so much from them.

Manchester, August 9 J. B. Dancer

Fascination

A very simple explanation may be offered of the seemingly mysterious facts of fascination, whether in man or the lower animals. Every one knows the old and ludicrous problem requiring us to decide what would happen to a hungry donkey placed at a spot exactly equidistant from two quite equally attractive bundles of hay. In theory the creature starves, being unable to make up its mind to choose one bundle rather than the other without any reason for such choice. In practice it is generally supposed that the unsteadiness of this world's affairs would speedily destroy the equilibrium of motives and leave the donkey free to make its meal of one or other of the bundles. But in critical emergencies, such as those mentioned in Mr. Curran's letter, when shot and shell are flying rapidly towards their victims, almost instantaneous decision is necessary. The circumstances are such that movement either to the right or to the left would be equally salutary and efficacious, but for the very reason that one movement would be just as good as the other, the mind makes its fatal pause of indecision. A man standing in the path of an advancing express train, and a small bird eyed by a snake, are probably affected both in the same manner. There need be no occult influence in the eye of the basilisk, as there can be no magical power in the iron and brass of the steam-engine, to transfix and fascinate the prey. Terror may no doubt in some instances paralyse the brain and make it incapable of choosing the method of escape, which to an intellect unembarrassed and free from panic would be the one obviously worthy of choice, but in the military examples cited by Mr. Curran it would be indecent to suggest such an explanation of the facts, and needless when the simpler solution is available.

Tunbridge Wells, August 9 Thomas R. R. Stebbing

© 1880 Nature Publishing Group